The end of our global oil reserves

A truly fateful topic

by

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Preface

This book is a follow-up to my book "*The end of global net oil exports. What really matters in the Peak Oil debate*", that was published 2022-2024 on *Internet Archive*. It consists of blogposts that I wrote on my English-Swedish blog "I väntan på Jesus" 2023-2024.

What I write in this book confirms and supports my thesis in my oil exports book, thoroughly. I build my thesis in this book through failures and misunderstandings, and take these with me as part of the book, as valuable thought experiments, and so that the reader can follow the process of my thought development, just as I also did in my oil exports book.

If Jean Laherrére and John Peach is right in their oil reserve calculations in this book, I'm also pretty much right in my oil exports mathematics. If for example MIT-mathematician and physicist John Peach is right in his calculation that the net energy in our oil reserves is at zero around 2037, **then it is not farfetched to think, as I did in my oil exports book, that the best-case scenario is that global oil exports minus China and India ("ANE-oil") are gone 2032.**

Lars Larsen, Stockholm, 29.10.2025

Global oil reserve mathematics. How many years of conventional oil do we have left?

This is an English update and refinement of the arguments in the following blogpost on my former blog "Forest Man", written 2019 (A later correction to this blogpost, 18.6.2023, is here):

Hur många år världen har kvar av de konventionella råoljereserverna om vi förbrukar olja såsom vi gjorde året 2018, in i framtiden

(English: How many years the world has left of conventional crude oil reserves if we consume oil like we did during the year 2018, in the future)

Our oil reserves in 2015. Some Peak Oil mathematics. *(this is all understandable with only secondary school [högstadie] knowledge of mathematics)*

Professor Michael Jefferson of the ESCP Europe Business School, a former chief economist at oil major Royal Dutch/Shell Group, veteran in energy matters, stated in this scientific paper from August 2015, that:

"*Put bluntly, the standard claim that the world has proved conventional oil reserves of nearly 1.7 trillion barrels is overstated by about 875 billion barrels."*

Peak Oil blogger Ron Patterson wrote about the paper in this article, and there he stated that:
"I thought the above article worth a post of its own. After all it is a vindication of what many of us have been saying for years now. And I especially call your attention to the line: "the standard claim that the world has proved conventional oil reserves of nearly 1.7 trillion barrels is overstated by about 875 billion barrels."
That puts conventional reserves at about 825 billion barrels."
So according to Jefferson and Patterson we had 825 billion barrels of conventional oil in August 2015. Let's try to count how many years we have left of oil reserves (crude + condensate, I count condensate here, because it's a byproduct of crude oil, so condensate stands in proportion to how much crude oil we get, and has always to be counted as a part of crude oil reserves), starting from August 2015. I do not count new oil discoveries, which is nowadays usually, on average 1/6 of the amount that we consume each year, because **these are almost always in unconventional oil**, and **if it is conventional oil, the oil is in so small fields, that the cost of producing it equals the cost of unconventional oil.**
Let's first decide how much crude+condensate we consume in one year. At the peak in 2018, we consumed 36,4 billion barrels of oil (all liquids), according to Julianne Geiger in this article on OilPrice.com.

~1/6, or ~17 % of this amount, is unconventional oil (things like natural gas liquids [NGL), refinery gains and biofuels). So we have to subtract ~17 % from 36,4.

So ~17% of 36,4 is ~30.

How many years of ~30 billion barrels yearly consumption does 825 billion barrels give us? Answer: ~27,5 years.

~27,5 years from June-August 2015 (Michael Jefferson's data was certainly some months old, at least) into the future is in the end of 2043.

Almost 8 years have passed since August 2015. ~8 X 30 = 240. We have used 240 billion barrels of crude+condensate since August 2015.

825 minus 240 is 585.

So we have 585 billion barrels of crude+condensate left in our global reserves (how many talk about this?). So how many years does this give us?

585 divided by 30 is 19,5. So we have 19,5 years left of crude+condensate oil reserves. This puts us in the very beginning of the year 2043.

So in 2043 our conventional oil reserves run out. The decline of crude oil+condensate from the peak began in December 2018, so the decline will span over a time period of 25 years. When are we halfway through this time? Answer: 12,5 years into the future, from December 2018, which is in June 2031.

At which point the reserves will be half empty, from the point of the oil peak, which was in November 2018? Not in June 2031, because the decline of our oil reserves begins slowly in the beginning after the oil peak is

reached, and the decline accelerates after that, as time goes by, it has an accelerated rate of decline. Therefore it seems reasonable to think that in 2035, at the earliest, as Alice Friedemann has said in an interview, we have half of our crude oil+condensate reserves left, from the point of the oil peak.

And what about the volume of oil exports in the future? If we produce only half of the peak volume of oil (in 2018), in 2035, what happens then with the oil exports by then, because **we take it from the surplus oil**, and the share of oil exports in our global oil cake is not half the amount of total oil production, but only 37,5 % (in 2021 we had 30 million barrels per day of oil exports, out of roughly 80 million barrels per day of global oil production, if we take only crude+condensate, which the 30 mbd figure of oil exports above entails). From this simple mathematical experiment we can conclude that the end of oil exports will happen well before 2030, or 2030 **at the latest.** Because if we lose our surplus oil, from the first half period of our remaining oil, and this surplus is 37,5 % of our remaining oil period, then we will lose this surplus after 37,5 % of the way forward, not half of the way forward. And if half of the way forward is 2035, after 12 years, and 6 years is half of that way, then 37,5 % of the way is 37,5 % of 12, which is 4,5. So oil exports end according to this calculation 4,5 years into the future, which is around 2027, which is in harmony with my other calculations of the end of oil exports on my blog "Forest Man".

But what about the unconventional reserves? Won't they give us more time? No, because it's really the

conventional oil reserves that matter, because unconventional oil is the high hanging fruit (according to the "low hanging fruit principle" of Richard Heinberg, that we pick the lowest fruit first), and unconventional oil production, too, begins with the low hanging fruit, therefore most of unconventional oil has to be left in the ground in the future as uneconomical to exploit. It cannot really be counted as reserves, because our ability to exploit it today is completely dependent on **massive debt**, so when this debt bubble burst, unconventional oil becomes too expensive, soon.

But assume that we will be able to exploit up to 200 billion barrels (just a guesswork) of unconventional reserves from 2015 and on. It does not give us much more time. Because if we count all liquids, i.e. the 36,4 billion barrels of oil per year figure above, and add 200 billion barrels to the 825 billion barrels number above, so that we arrive at 1025 billion barrels, we then have to divide 1025 with 36,4, and this gives us 28,2. So from August 2015 and ~28 years into the future, is the year 2045 (1). So it gives us only two years more time, if we count 200 billion barrels of unconventional reserves from 2015 and on. Of these 200 billion barrels we have produced 8 X 6,4 which is 51,2 billion barrels. We have then 150 billion barrels left. Will this amount be produced? Some of it will certainly, but perhaps not all.

But the amount of unconventional is not the real issue. The real issue is rising EROEI, Energy Return on Energy Invested. **Because it does not matter, if the question is the timing of the collapse of civilization and oil industry itself, how much unconventional oil we**

produce, if this is done at the expense of the global economy, through financial self-cannibalization, which in the end will will hurt the oil industry, and spell the demise of this industry itself.

Also, our conventional oil reserves are subject to the same "low hanging fruit principle" as described above, because the cost of those reserves is also rising, because when an oil field ages, its natural decline rate rises, and it costs more and more to extract the oil in it, you have to deploy expensive technology to get the last oil up, so called "enhanced oil recovery". The cost of all this just rises and rises with time. But still conventional oil is, and always will be much cheaper than unconventional oil.

Our oil reserves back in 1998. An outside confirmation of Jeffersons estimates.

Let me end this blogpost with a confirmation for Michael Jefferson's oil reserve estimates from a very official source, namely BP:s Statistical Review of World Energy (which usually overstates the oil reserves by very much nowadays), their oil reserve estimates a long time ago:

Irina Slav from "OilPrice.com" wrote in this article on November 11, 2019, the following:
"*In its latest Statistical Review of World Energy, BP estimated the world had 1.7297 trillion barrels of crude oil remaining at the end of 2018. That was up from 1.7275 trillion barrels a year earlier and 1.4938 trillion barrels in 2008. In 1998, the world had 1.1412 trillion barrels in remaining reserves.*"

We can with some simple mathematics make the last sentence confirm Michael Jefferson's oil reserve estimates above:

How long time elapsed from 1998 to 2015? The time between these years is 17 years.

1.141 billion barrels minus 825 billion barrels equals 316 billion barrels.

316 billion barrels divided by 28 (this is the average consumption between 1998 and 2015, it's my guesswork, I do not find data about this on the internet) is 11,3.

But 11,3 years back from 2015 is 2004, not 1998. Did BP understate the reserves in 1998?

Not by much if we account for the new oil discoveries between 1998 and 2015.

According to this site, *"Between 1990 and 2011, the volume of global oil reserves increased significantly from just over 1 billion barrels in 1990 to nearly 1.7 billion".* If we account for global yearly oil discoveries of at most 1/3 of the yearly consumption (today it is 1/6, it is declining all the time), we have accounted for an additional 4-5 years at most to the 11,3 figure above (5 X 28 = 140. 140 is 1/5 of 700.). Then we are almost at 17 years. So BP did not miss the mark by much back then. We just found **a lot** of unconventional oil since 1998. Remember that 2010 was the year when the shale oil revolution began in earnest. We found the shale oil reserves, and they were **huge**.

But all this only shows that BP was pretty on spot with its estimates of conventional reserves back then in 1998, and that there is a broad agreement between BP:s Statistical Review of World Energy 1998 and Michael Jefferson's calculations in 2015. The main lesson from this is that **we should not mix conventionals and unconventional when we calculate oil reserves**, and that **we cannot count on our enormous unconventional oil reserves when we try to calculate the remaining amount of reserves that are economical to produce**. Why? Because only massive amounts of debt makes unconventional oil possible to produce at all, because of their very low EROEI. And remember that the EROEI rises exponentially, and we have to go exponentially into debt to fund all this. **It's not sustainable.**

Epilogue

In the end, it's good to listen to the Bible in these matters, to gain wisdom. There it is written: "*Teach us to number our days, that we may gain a heart of wisdom.*" (Psalm 90:12) As professor Guy McPherson likes to say: Our days are numbered.

(1) Professor Charles A.S. Hall (b. 1943) said 2022 in this youtubevideo that we had 25 years of oil left, that puts us in 2047 (he based it on this well-researched scientific paper that he wrote together with Jean Laherrere and Roger Bentley in 2022). That's only two years more than 2045. It's not much. But Hall missed the mark somewhat. But still it is somehow a confirmation of my calculations

above, compared to the official oil reserve numbers. The article "20 years later, we still have 40 years of oil left" from June 14, 2007, by Margery Connor on "EDN" is also an independent confirmation of Hall's calculations. So also the article "It's About Forty Years Until the Oil Runs Out" on January 01, 2008, by Michele Chandler, on the site "Stanford Business". And also the article "Only 40 years of oil left – and they said that 30 years ago", on July 4, 2008, on BusinessLive, And also this article, this article and these comments on a forum, (it seems that at that time many thought we had 40 years of oil left. Still today many think we have 40-50 years of oil left, by counting unconventional oil reserves).

P.S. Here is an update of this blogpost posted on this blog 2023-06-17, titled "Some corrections to my global oil reserve math":

"I have to correct the blogpost above, where I only subtracted 17 % from the 36,4 billion barrels of yearly use. In reality, I should subtract 17 % more, because this year not 17 % but about 34 % of the All Liquids global oil volume was unconventional oil (I have difficulties wrapping my head around this being such an incredibly big volume of the total). And I forgot that the "crude + condensate" label contains a lot of unconventional oil, i.e. for example shale oil and heavy oil. This was really a bad mistake by me. This year conventional oil production has been somewhere at 68 million barrels per day (mbd), and All Liquids oil production have been close to the all time peak, at about 102 mbd. (Check out the volume of

conventional oil this year, here). This is a difference of about 34 %. The conventional oil peak was in 2016 at ~74,2 mbd. Back then the "All Liquids" was at 97 mbd.

So if we add 17% to the 20 years that I got as the time of oil reserves we have left, we have to add 3,4 years, because 17% of 20 is 3,4. So if we add 3,4 year to 2045 we come to 2048. This gives us 25 years of oil, only 3-5 more years than I thought before (**3 years is not much.** Think how fast 3 years goes in your life). This year 2048 is very special to me, for reasons I have described here. The result is also in broad accordance with Charles S.A.Hall's calculations mentioned in note (1) in the first blogpost above. Others have come to even more radical conclusions than my miscalculation above, see this blogpost of mine. Because of these, I did not rewrite the blogpost above, it was an interesting thought experiment, that I shall let be as it is. It is the result I get if Jeffersons oil reserves were crude + condensate (this label is often confused with "conventional oil"). But I don't think they are.

This is also an important reminder: One should also try to calculate (but this is almost impossible) that not every year, into the future, will give us 36,4 billion barrels of oil, but that this volume will shrink successively, very abruptly in the end, giving us more oil reserve time. But this goes too far for my abilities.

I will also add one correction to the calculations of oil exports in the 13 May blogpost:

I would estimate that we in 2023 have about 26 mbd of oil exports left, globally. 26 mbd is ~30 % of the crude + condensate volume we have today. So if we still think we have half of the global oil production volume that we have today, in 2035, which is 12 years into the future, then 30 % of 12 is 4 years. So this gets us to 2027. This is almost the same result I got from my previous calculations. If we postpone the half way mark to half the way between 2023 and 2048, we get to 12,5 years into the future, and it does not make a big difference. If we then think that the half way mark of our remaining oil production linger a little bit longer, say to 2038, then we get 15 years, and 30 % of 15 is 5 years. It makes the oil export go in 5 years, in 2028. Not a big difference.

If we have to calculate that the oil export years are 30 % of all the 25 years, then we arrive at 7,5 years into the future, which is in the end of 2030. It does not give us much more time. And the Available Net Exports (world oil exports minus China and India) will probably stop a couple of years before that, in 2028."

What "enhanced oil recovery", or pressing oil production to maximal capacity, does to our oil reserves

"But Simmons argues that the desert kingdom could run dry, spelling out his case in his book "Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy." The Saudis, he says, have overworked their oil fields, pumping too much crude too quickly -- a practice that can reduce the amount a field eventually produces."

(from this article by David R. Baker from August 21, 2005 on the site *www.sfgate.com*)

Think about it. This was already in 2005, when the book by Matt Simmons was published.

Since then this issue has become worse and worse. We want to save the day, and stave off a global recession/depression. Buy today, and pay tomorrow. Borrow the oil of the future, the oil of future generations.

"Enhanced oil recovery", it's called.

For example Norway is doing this in the North Sea, Norwegian sea and Barents sea to a degree that's simply baffling. With monster technology. I read about it in Therese Uddenfelt's Swedish Peak Oil book from 2016. Seven years has passed since then, and Norway just continue staving off its oil industry's abrupt decline. Remember that Sweden is completely dependent on oil imports from Norway. Much is on stake for Sweden.

It is the phenomenon that has been described many times in the Peak Oil-literature, and is best expressed by the Finns Rauli Partanen/Harri Paloheimo/Heikki Waris in the book "The world after cheap oil" from 2014, with the following words:

"Given that oil is a non-renewable resource, the faster we produce it today, and the more aggressively we try to keep production high, the steeper the decline will be when it begins."

Mark their words.

Trying to press the oil fields to maximum capacity, which happens globally today, is to create a petroleum bubble, which can be said to be the mother of all bubbles, and be the foundation for all bubble creations in the broader global economy. That all bubbles build upon this petroleum bubble.

This is why I think collapse will be abrupt when it happens, as people like human ecologist, systems thinker and collapsologist David Korowicz think. We have

kicked the can down the road so far, so far, as the collapse-economist Peter Schiff often talks about.

This is the explanation for the phenomenon that the wolf seems to never appear. Maybe it never will?, some think. Why do we not live in a global depression, the peakoilers promised us this by now.

But if you think so, you are fooled. You have then forgot the phenomenon of bubbles, debt funding and the likes. That we can borrow the oil of future generations to the present time. Borrow it with "enhanced oil recovery" and debt. In absurdum. Until we can't anymore. And the more we delay the collapse, the steeper it will be.

So we might not have all the 585 billion barrels of conventional crude oil (+ condensate) that I calculated we had in this blogpost recently. The situation might be even worse than Ron Patterson and Michael Jefferson envisioned.

Remember that there are many things that can go wrong and make even more oil stay in the ground as uneconomical to produce. For example wars may disrupt oil flows. Locally. Hyperinflation and the wild rise of the cost for almost everything, may also make much oil production unprofitable. Remember that everything is connected, that the oil industry need cheap prices for for example the resources that new offshore oil rigs are made of.

How many years of oil reserves does Saudi Arabia have left?

See this youtubevideo: "Saudi Arabia Is Probably Lying About Their Oil Reserves" from 17.8.2022.

The video says that Saudi Arabia maybe only had 136 billion barrels of oil reserves in 1988. We have used about 105 billion barrels of these reserves over the past 34 years. This would leave us with only 31 billion barrels in 2022. This would mean that the reserves are used up in ten years from that year on, i.e. in 2032. But the videomaker cannot believe in this. He says it's more than likely not true. He says that while Saudi Arabia may be lying about having 70 to 100 years worth of oil left, it's likely that they at least have a few decades left. And this matches up with the kingdom's actions as well.

My comment: Well, if Saudi Arabia has, say, 20 years of oil reserves left, this places the end of their reserves in 2043, which matches well with the end of overall global conventional oil reserves, see this blogpost by me. But it might be a best-case scenario. This may be because the Saudis have treated their oil fields too aggressively, pumped too aggressively, which shorten the lifetime of the oil fields.

15 years of global oil reserves left?

I have in this blogpost stated that our global oil reserves may run out in 2043-2045 (in my corrected calculations, in 2048). I thought that was the most radical estimate.

But there are even more radical estimates out there.

So for example peakoiler John Peach suggests, in this recent Youtube video by Andrii Zvorygin (see the part beginning at 10.00 minutes into the video and then further), that we have 15-20 years left of global oil reserves, or 563 billion barrels of conventional oil. The conventionals is what counts here. And Peach suggests that we use 37 billion barrels of oil per year. 563 divided by 37 is 15,2. In my blogpost that I linked to above from May this year I calculated that we had 585 billion barrels left, but I calculated the years that were left using a 30 billion barrels per day figure, because I subtracted all the oil except Crude + Condensate from the figure. This John Peach hasn't done, and therefore he comes up with this 15 year figure. So the 20 year figure is probably closer to the truth.

But there are others who also have come to this 15 years of reserves left **or even less**. Just read this article:

"Big Oil could see proven reserves run out in less than 15 years", (*Oil & Gas Journal*, May 5, 2021).

Two years have elapsed since that prediction, so now we should have only less than 13 years of oil reserves left for Big Oil. That takes us to 2036 or just before, the pivotal year I thought I would die, some time ago.

Remember also the radical numbers in this blogpost of mine, which was not believed in, the numbers were too radical.

I seek further on the internet for radical estimates. In this post on *Religious Forum* the writer believed, in March 2018, that we had 19 years of oil reserves left. This year it is 14 years of oil left. This article from September 2021 says that US and China has 17 years left, which this year makes 15 years left.

What did "the father of Peak Oil", Colin J. Campbell (who died last year), say about the oil reserves? In the article "The end of oil is closer than you think" in *The Guardian* in April 2005, Campbell said:

" "About 944bn barrels of oil has so far been extracted, some 764bn remains extractable in known fields, or reserves, and a further 142bn of reserves are classed as 'yet-to-find', meaning what oil is expected to be discovered. If this is so, then the overall oil peak arrives next year," he says."

"Bn" is billion. Did Campbell only think about conventional oil here? He might have (1). But he might also have included heavy oil and tar sands, because they

have a long history, they were in operation at the time he said those things. Shale oil was definitively not counted.

Though, in my previous calculations, I calculated only conventionals. If Campbell counted both heavy oil and tar sands reserves, the outlook for the oil industry is even more bleak.

But let´s work out the math of what Campbell said, here. 764 bn + 142 bn = 906 bn barrels. That was in April 2005. More than 18 years has elapsed since then. And supposing that the average use of conventional oil between 2005 and 2023 is about 28 bn (my guesswork), then 18 X 28 = 504 bn. 906 minus 504 is 402 bn barrels of oil. So according to Campbells old estimate, we should now have about 402 bn barrels of oil left in the reserves, of conventional oil. How many years does this make with our current consumption? 402 divided by 30 is 13,4 years. So if we follow Campbells old estimate from 2005, we should run of out conventional oil reserves in the end of 2036. **That's one of the most radical predictions I have heard** (comment added later: maybe the failed predictions in this article are even more radical). But much has changed since, and probably there were many factors that Campbell did not take into account back then, so I still think that it's more plausible that we have 20 years left. Just think about Campbells failed predictions of Peak Oil, but that failure was much due to the rise of unconventional oil, which cannot really be counted here, in the reserve estimates, because all that oil is completely dependent on massive, unpayable debt and burning through massive amount of investment money.

But, mind you, **Campbell's estimate comes close to, or plays in the same division as the utterly radical numbers in this blogpost of mine, where they said that Saudi Arabia according to certain calculations would run out of oil reserves in 2032, numbers which was not believed, they were too radical.**

So we should take heed of this and prepare for the worst, and not think we have very much time, this will fool us to think there is no need for living with urgency in these End Times. Even if we had 50 years of oil reserves left, as many think, it's also very little, it means that civilization will end during my lifetime.

And in the end, civilization does not last until the last barrel of oil in our oil reserves is consumed. It collapses **way** before that. This is very important to notice.

(1) It's very strange that people often don't specify what kind of "oils" they count in their calculations and results (so John Peach and Colin Campbell). I have also been confused in this regard.

Some corrections to my global oil reserve math

(This is an important update for those who have read my blogpost "Global oil reserve mathematics. How many years of conventional oil do we have left?" that I posted in this space on May 13, 2023:)

I have to correct the blogpost above, where I only subtracted 17 % from the 36,4 billion barrels of yearly use. In reality, I should subtract 17 % more, because this year not 17 % but about 34 % of the "All Liquids" global oil volume was unconventional oil (I have difficulties wrapping my head around this being such an incredibly big volume of the total). And I forgot that the "Crude + Condensate" label contains a lot of unconventional oil, i.e. for example shale oil and heavy oil. This was really a bad mistake by me. This year conventional crude oil production (minus condensates) has been somewhere at 68 million barrels per day (mbd), and "All Liquids" oil production have been close to the all time peak, at about 101 mbd. (Check out the volume of conventional oil this year, here). This is a difference of about 34 %. The conventional crude oil peak was in 2016 at ~74,2 mbd. Back then the "All Liquids" was at 97 mbd.

So if we add 17% to the 20 years that I got as the time of oil reserves we have left, we have to add 3,4 years, because 17% of 20 is 3,4. So if we add 3,4 year to 2045 we come to 2048. This gives us 25 years of oil, only 3-5 more years than I thought before (**3 years is not much.** Think how fast 3 years goes in your life). This year 2048 is very special to me, for

reasons I have described here. The result is also in broad accordance with professor Charles A.S. Hall's calculations mentioned in note (1) in the first blogpost above. Others have come to even more radical conclusions than my miscalculation above, see this blogpost of mine. Because of these, I did not rewrite the first blogpost I linked to above, it was an interesting thought experiment, that I shall let be as it is. It is the result I get if Jefferson's oil reserves were Crude + Condensate (this label is often confused with "conventional oil"). But I don't think they are.

This is also an important reminder: One should also try to calculate (but this is almost impossible) that not every year, into the future, will give us 36,4 billion barrels of oil, but that this volume will shrink successively, very abruptly in the end, giving us more oil reserve time. But this goes too far for my abilities.

I will also add one correction to the calculations of oil exports in the May 13 blogpost:

I would estimate that we in 2023 have about 26 mbd of oil exports left, globally. 26 mbd is ~30 % of the Crude + Condensate volume we have today. So if we still think we have half of the global oil production volume that we have today, in 2035, which is 12 years into the future, then 30 % of 12 is 4 years. So this gets us to 2027. This is almost the same result I got from my previous calculations. If we postpone the half way mark to half the way between 2023 and 2048, we get to 12,5 years into the future, and it does not make a big difference. If we then think that the half way mark of our remaining oil production linger a little bit longer, say to 2038, then we get 15 years, and 30 % of 15 is 5 years. It makes the oil export go in 5 years, in 2028. Not a big difference.

If we have to calculate that the oil export years are 30 % of all the 25 years, then we arrive at 7,5 years into the future, which is in the end of 2030. It does not give us much more time. And the Available Net Exports (world oil exports minus China and India) will probably stop a couple of years before that, in 2028.

Are we double counting natural gas?

In the global oil production volume ("All Liquids"), maybe at least 13-14 % (probably more, but I don't find data about it on the internet) of it is Natural Gas Liquids (NGL), that we make from natural gas, through expensive conversion techniques. This amount is growing all the time.

"As natural-gas production has increased at a faster rate than oil production since about 1970, the percentage of total petroleum liquids represented by NGL has increased steadily from about 4% in 1970 to about 9% in 1995."

(from this article: https://wiki.aapg.org/Natural-gas_liquids)

So, you see, if the volume was 9 % in 1995, it is probably at least 13-14 % today, because the oil industry has lately tried to save itself through massive amounts of NGL.

But if we take this amount of natural gas from our natural gas production, and count it as oil, **then we double count natural gas!** Because we don't subtract this volume of natural gas from our natural gas production statistics! This fools us to think we have more energy than we in fact have. **It also fools us to think we have more oil than we have**, because NGL is not at all as valuable as crude oil, and has no diesel in it. Diesel is the most valuable oil product.

So the energy situation in the world is worse than many think, because of this deception.

Let me illustrate this double counting. If we are a big commercial fruit garden, and have many apple and orange trees, and try to count our apple trees and apples and our orange trees and our oranges, to figure out how rich we are, then if some of the apple juice can be blended with our orange juices, then **we fool ourselves** if we count these apples as oranges, without subtracting the apples we blend with oranges from the amount of apples we have in our apple garden.

Exactly this is what has happened to our oil industry. Besides, the oranges were much more valuable than the apples, making the deception even worse.

Oil discoveries at a new low so far this year. And something about our oil reserves.

"Oil Exploration Grows But Discovered Volumes Fall To New Lows", by Rystad Energy, on Aug 01, 2023, on *www.oilprice.com*.

From the article:

- **"Rystad: in the first half of 2023, explorers found 2.6 billion barrels of oil equivalent.**
- **The exploration and production (E&P) industry is in a transitionary period, with many companies exercising increased caution and shifting their strategies to target more profitable and geologically better-understood regions.**
- **In the hunt for new resources, exploration companies are prioritizing the offshore sector."**

End quote.

One could add that deepwater offshore oil is nowadays often heavy oil (most of the new discoveries are nowadays deepwater, already in 2018 they wrote this*), and a lot of it today is unconventional oil (this pertains especially to ultra-deepwater oil, because it is so horribly expensive and non-traditional. It is becoming more and more so. Usual deepwater oil is also becoming more and more so, i.e. becoming unconventional oil), and, what they are finding in the offshore sector are smaller and

smaller fields every year**, which are more and more expensive to get oil from. I.e. EROEI is falling, and fast.

One could also add that during the last decade the average amount in oil discoveries in a year has been about 6-7 billion barrels of oil. This year it is even lower than that, a little above 5 billion barrels of oil, if the trend from the first half of the year continues. It is 1/7 of what we consume in a year.

The overall trend is downward, and what we find is more and more expensive oil.

I also recommend that you watch this Youtube discussion 11.9.2023, where John Peach pretty confirms what I have written on this blog about our global oil reserves. According to Peach we have only about 500 billion barrels of conventional oil reserves left, which is about 20 years of current consumption. I.e. 2043 the oil reserves are gone. My end point was 2045 and 2048 in this blogpost 13.5.2023.

* in 2013, they wrote in this article the following: *"First, deepwater has become the predominant source of new oil and gas discoveries worldwide, accounting for more than 50% of all conventional new reserves of 170 Bboe."*

** *"Of the roughly 47,500 oil fields in the world, 507 of them, about 1%, are giant oil fields holding nearly two-thirds of all the oil that has ever been, or ever will be produced, with the largest 100 giants, the "elephants,"*

providing nearly half of all oil today. Since the 1960s, the world has consumed more oil than what has been discovered, and the average size of new oil fields has declined, leaving us heavily dependent on the original giant oil fields discovered over 50 years ago (Aleklett et al. 2012)" (from this blogpost by Alice Friedemann at the blog *Energy Skeptic* on May 16, 2020)

A confirmation of the thesis that the oil industry is finding smaller and smaller oil fields

is in this recent blogpost by Tim Watkins on the blog *The consciousness of sheep* (14 hours ago as I write this).

Our new oil discoveries are getting smaller and smaller every year, and more and more costly to produce - exponentially

(A continuation of these blogposts on the same theme)

Mathematics is dead until one arrives at things like Peak Oil, the end of global net oil exports and the remaining conventional oil reserves (which are the petroleum reserves that really matters, the rest is too expensive to produce, and is becoming more so for every year - exponentially).

Then reality begins to be **much more interesting** than computer games, fantasy novels, science fiction novels, movies, opera and theatre.

Just take as an example the fact that global oil discoveries become smaller and more expensive **every year** (remember the "low hanging fruit principle" of Richard Heinberg, we exploit the cheapest stuff first)**.** More and more of the discoveries are in unconventional oil, which is the more expensive, higher hanging fruit on the "oil tree".

Just look at this quote from this article in *Oil & Gas Journal* from 2019:

"Basins that are early in their life cycle—the frontier and emerging phases—have average discovery sizes 10 times greater than average discovery sizes made in the later, more mature basins. The average discovery size of these early life-cycle basins is 210 million bbl vs. 25 million bbl from mature basins discovered during the last 10 years."

This means that five years ago the average discovery size of new oil fields had varied from 210 mbd to 25 mbd during the last decade, 2009-2019. The world produces 101,8 mbd of oil (All Liquids) today, so 210 mbd is **slightly more than two days of total global oil consumption today**, and 25 mbd is about **a quarter of our daily total global oil consumption.**

Today the discovered fields are even smaller. I think they are becoming **exponentially** smaller (faster and faster). And exponentially more and more is unconventional oil (the amount of condensates and Liquified Natural Gas [NGL] is just soaring, more and more for every year, to make up for the shortfall in conventional crude minus condensate, which is declining, and **has declined for a long time**). In fact I have said before that conventional oil in very small fields is to be counted as unconventional oil, **so expensive it is to produce**, especially offshore. Very much of new oil discoveries are offshore. The onshore fields are thoroughly researched. Otherwise we would never have embarked on the **extremely** costly shale oil and tar sand fields in North America and Venezuela.

At the end of the day the new fields we find will be so small that they are uneconomical to produce, and **we are very near that fateful time.**

A lot of the recently reported new oil discoveries are not to be trusted. They often make wildly optimistic estimates of our future capability to exploit the newly found reserves economically, and they never take into account our **exponentially growing debt bubble** and the future collapse of civilization, which, for example, will make the remaining gigantic shale deposits and tar sands deposits worthless. If we cannot **afford** to produce the oil we find, because of economically hard times, because of wars and global heating, **we do not have it in our reserves, cannot count them as reserves. This is why I focus so much on conventional reserves when I calculate our remaining oil reserves. This is very important to understand.** All those who count unconventionals in our reserves, boasting with them, are making a really bad job. And this is in fact mainstream to do.

Remember that **we have to afford the "Green Transition" too**, and this will be just too much for us, plagued as we are by overshoot in all areas and a growing ecological collapse.

In this article from 2013, they said that India's oil reserves will last for only 20 years. Eleven years has passed, now we have 9 years left. Remember how many people that live in India. They will import oil as crazy over there.

End note

"Of the roughly 47,500 oil fields in the world, 507 of them, about 1%, are giant oil fields holding nearly two-thirds of all the oil that has ever been, or ever will be produced, with the largest 100 giants, the "elephants," providing nearly half of all oil today. Since the 1960s, the world has consumed more oil than what has been discovered, and the average size of new oil fields has declined, leaving us heavily dependent on the original giant oil fields discovered over 50 years ago (Aleklett et al. 2012)" (from this blogpost by Alice Friedemann at the blog *Energy Skeptic* on May 16, 2020)

Something more on the various estimates of our remaining global oil reserves

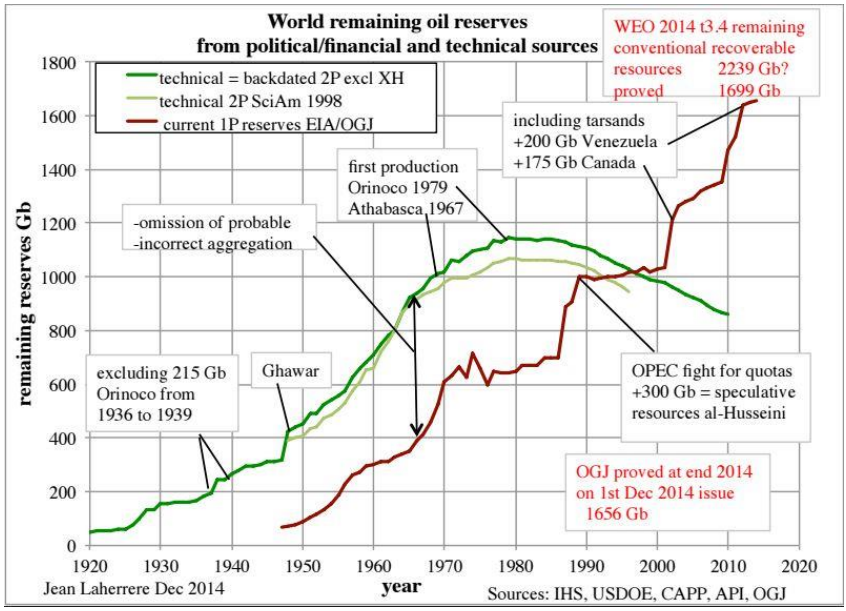
(This blogpost can very well be read to the sound of The Smiths's song "Girlfriend In A Coma")

It fits so extremely well with the ecomodernist, techno-optimist, techno-utopian, cornucopian, techno-grandiose hubris and vulnerability-denial of our political and scientific leaders, and also of IEA (International Energy Agency, the leading global energy information institute of our world), to vastly exaggerate our oil reserves (having always done so), that independent oil researcher John Peach of the video chat group led by Canadian-Ukrainian hippie Andrii Zvorygin (and which contains heavy names like associate professor Simon Michaux, one of the most learned peakoilers out there) could very well be right in this recent YouTube video, where he estimates our remaining global conventional oil reserves (I think he must have counted "proven reserves", 1P, and only conventionals) at 563 billion barrels. This gives us about 23,5 years of conventional crude oil (minus condensate) use of 24 billion barrels every year, which takes us to the middle of the year 2047, exactly when veteran professor and very learned oil expert and EROEI pioneer Charles A.S.Hall, estimated it at, in this YouTube video from the end of 2022. I made an own calculation on

this blog, here, and landed at 2048, almost exactly at the same year.

Everything points in the same direction, it seems to me.

The veteran French oil geologist Jean Laherrére (b. 1931) has done much work on the oil reserves. **His data completely confirms the data of John Peach**. Just study this graph from this blogpost on the blog *Peak Oil Barrel* 2015:



From this graph we see that in 2010, there was about 870 Gb of conventional oil reserves left. If we follow these data, we can calculate what the remaining conventional reserves would be today. 14 years has gone since 2010.

We use about 24 Gb of conventional oil every year as of recent. We used a little less in the years before 2018. I put an average of 22 Gb yearly use since 2010, up until today. 14 x 22 is 308. Then 870 - 308 is 562. Almost exactly the same conclusions as John Peach arrived at, which was 563 Gb.

In a 2022 paper, Laherrére wrote: "*Thus, we suggest that the global reserves of 'realistically-accessible' oil (essentially, conventional oil including 'light-tight' oil) are probably only about 750 Gb or so, once the extra heavy oils and adjustments for probable overstatements of Middle East and FSU reserves have been subtracted. Moreover, this measure of oil reserves has been on a declining trend for over 35 years, and would last only about 25 years at current rates of production.*" (Quoted in this comment to a blogpost on the blog *Peak Oil Barrel* in 2023)

Now I know at least six educated oil reserve experts that has arrived to the same conclusions: John Peach, professor Charles A.S.Hall, Jean Laherrére, Ron Patterson, James Dietrich (see this blogpost of mine) and professor Michael Jefferson.

Will the reserves last longer if we also count the unconventionals? No, because for every 24 Gb of conventional oil consumed every year, there is 12 Gb of unconventionals consumed. And the economically recoverable unconventional reserves is probably not very much more than 50% less than the conventionals (12 is 50 % of 24). Why? Well, because these reserves get

every year more expensive to produce, and exponentially so, so only a part of our vast unconventional reserves will ever be produced, because this production is often propped up by **massive** debt, and has a very low EROEI, and exponentially so into the future. It does not matter if we have 1000 Gb of unconventional reserves, if this is so.

So how many additional Gb:s of unconventionals do we have?

Oil expert and Peak Oil blogger Dennis Coyne, who has done very detailed research, also on the oil reserves, wrote in 2023 in this comment to a blogpost on the blog *Peak Oil Barrel*: *"Unconventional URR (Ultimate recoverable resources) might be as much as 600 Gb, the 954 Gb unconventional URR implied by the Laherrere analysis seems unlikely to me."*

We might have produced half of that already, so we have to subtract 300 Gb from those 600 Gb. It gives us 300 Gb of remaining unconventional oil reserves. If we add condensates, it's 14 % more, i.e. 42 Gb more. We might have 342 Gb of remaining production of unconventional oil reserves.

If Laherrére is correct, then half of 954 Gb is 477 Gb, and with condensates added, it becomes 543 Gb of remaining unconventional reserves.

Because of the future collapse of our civilization, we will probably never be able to take all that up. It's

a **massive** amount. Both Laherrére's and Coynes numbers.

As the conventional oil industry collapses in the future, so will the unconventional oil industry collapse with it, and **we will never be in a position when we have used up our conventional oil reserves, but live on our unconventional oil reserves**. So expensive the latter will get. **This is a very, very important fact.** It is also very important to remember that as the unconventionals get more expensive, the conventional oil also get more and more expensive to produce, which makes the unconventionals even more expensive, in a self-reinforcing positive feedback loop.

All in all, we have mostly almost as much unconventional oil reserves as we have conventional oil reserves left.

Also very important to understand, is that **we will never be able to extract the last drops in our oil reserves**, the total collapse of civilization will come way before that, at least 5 years before, taking us to 2042. And the end of global net oil exports will happen way before that, at least 5 years before, taking us to 2037 *, which also will collapse the global economy totally, because there is about 162 oil importing countries that becomes without oil. It's also true that the oil importing countries will collapse totally way before the last drops of oil imports are consumed, at least a couple of years before, taking us to 2035. And their collapse will begins slowly even before that, at least a couple of years before, taking us to

2033. So my estimate that I will die by starvation in 2036 doesn't seem farfetched to me, still.

Remember, in all these estimates, I have been conservative.

* I have in this book calculated the end of global net oil exports to be in 2027, but I think 2037 may be the absolute upper limit for this.

"Too Much by Half: The Coming Cut in Proved Oil Reserves". Book by James Dietrich

"Too Much by Half: The Coming Cut in Proved Oil Reserves". Book by veteran Petroleum Reservoir Modeller and Consulting Reservoir Engineer James Dietrich (see also here about him, it's a man who really knows what he's talking about[1]), published on July 8, 2019. See the book on Amazon, here. I don't find any reviews of the book, other than three small comments on the book's page on Amazon, strangely enough, thinking about its great importance.

Here is the text that introduces the book on Amazon:

"The year was 2007 and the financial world was crashing. The setting was my residence in Moscow, Russia. A visiting American PhD economist working for the Russell 2000 asked me, "And how good are the estimates of proved oil reserves in your industry." She knew that mathematical models are used to predict value and risk in her world of money and in my world of oil. Perhaps she felt a sense of humiliation — the financial models had totally failed. I recall my response, "It seems that a barrel of oil reserves becomes three barrels if it's under Russia." That was a flip answer, but perhaps not that exaggerated. Her question stayed with me. Eight years later given even more international consulting experience, my sober answer became, "Proved oil reserves are too much by

half." In other words, globally and on average, three barrels of publicized oil reserves are actually closer to two barrels. Here we're talking only about proved reserves. These are hydrocarbon volumes that are estimated with reasonable certainty to be commercially recoverable. In probabilistic terms, use of the words "reasonable certainty" implies there is a 90% chance of meeting or exceeding the quoted recoverable volumes. During periods of rising and falling oil prices, oil companies increase and decrease their estimates of proved reserves, in order to satisfy the requirement that the reserves are commercially recoverable. This is the story of how reserves have become systematically inflated, aside from any influence of rising oil prices. The book is part way between memoir and non-fiction — too much of one to be properly the other. Dubbed narrative non-fiction, it may appeal to those interested in the "peak oil" debate, an international consulting career, expat living, or simply the absurdity of people trying to work together. My views on the reserves question are derived from working independently for decades inside Big Oil as a consultant. They are likely to differ from the perceptions of outsiders who rely on material made available for public consumption. Consider the attorney working as a financial services executive who has written a book about oil in 2016. He tells us we're at the dawn of the fossil fuel era, touting that his book "... incorporates facts from leading authorities and firsthand sources, such as the revenue predictions of major oil companies and the United States government." Since when are we expected to accept an equivalence between facts and predictions? The book was written to counter the claims that we are

awash in oil. A term called the R/P ratio is central to the debate on peak oil. It's the ratio of known reserves to the rate of use — the ratio is about 40 years for oil and 60 years for natural gas. If world reserves are indeed over-booked by half, those estimates shorten to nearly 25 years for oil and 40 years for gas. We will likely have a lot less time to move away from the use of fossil fuels before the tanks are empty. And then consider: The worldwide supply of oil, as of any mineral resource, will rise from zero to a peak and after that will decline forever. The crisis comes not when the last drop is pumped; it arrives when we've consumed nearly half the oil there ever was. At that point, steadily falling supply can not meet continuing rising demand. Nearly all the pundits agree that we're close to the half-way point. The book reads mostly as memoir, telling the story as a chronology of projects in which the author was retained as a consulting engineer to estimate, develop and produce reserves. The reader will get the sense that as we're nearing the half-way point, it's nature — geology and physics — that is preventing us from unlocking more oil from mature reservoirs, never mind oil prices!"

My comment: This book confirms what petroleum experts Michael Jefferson and Ron Patterson have said, which I refer to in this blogpost of mine from 2023. I quote from the blogpost:

"Professor Michael Jefferson of the ESCP Europe Business School, a former chief economist at oil major

Royal Dutch/Shell Group, veteran in energy matters, stated in this scientific paper from August 2015, that:

"*Put bluntly, the standard claim that the world has proved conventional oil reserves of nearly 1.7 trillion barrels is overstated by about 875 billion barrels."*

Peak Oil blogger Ron Patterson wrote about the paper in this article, and there he stated that:
"I thought the above article worth a post of its own. After all it is a vindication of what many of us have been saying for years now. And I especially call your attention to the line: "the standard claim that the world has proved conventional oil reserves of nearly 1.7 trillion barrels is overstated by about 875 billion barrels."
That puts conventional reserves at about 825 billion barrels." "

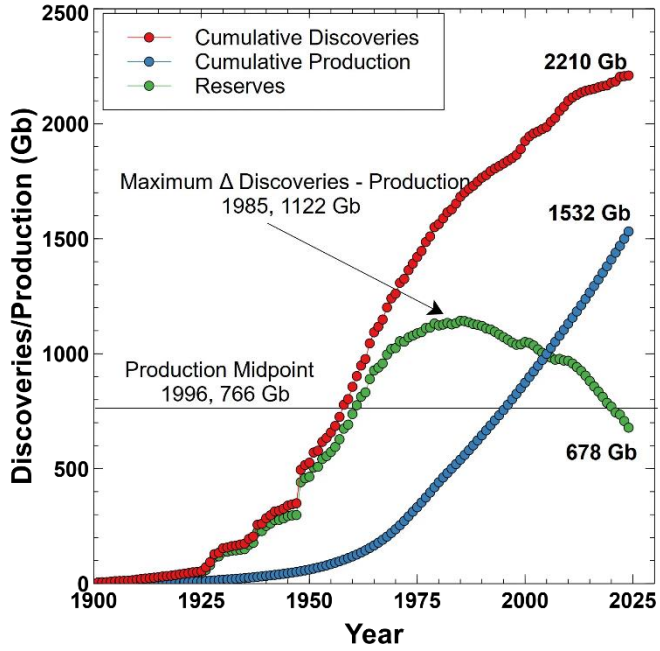
[1] *"**My views on the reserves question are derived from working independently for decades inside Big Oil as a consultant.**"* (From the introduction text to the book)

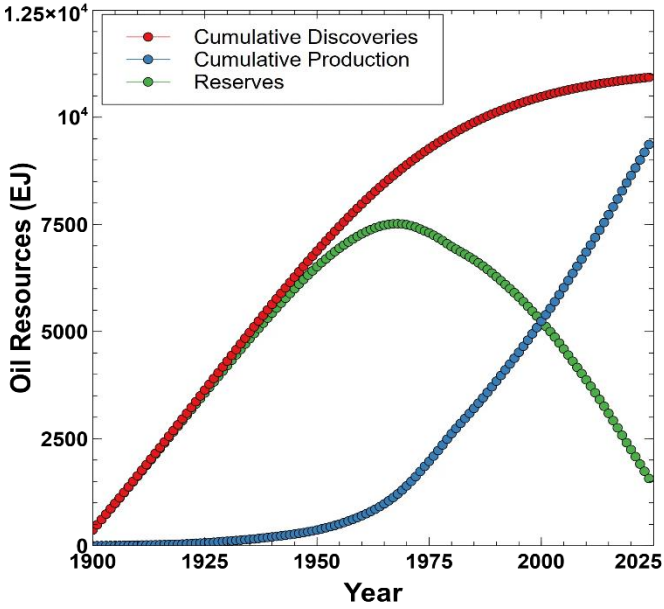
Very important Peak Oil-article by John Peach

Read it here:

[World Fossil Fuels Discoveries and Production. An analysis of current reserves. October 03, 2025, John Peach]

From the article:





My comment: Do you see the green lines in the two charts above? If the trendline is followed, the oil reserves are empty 2037-2042. This is very serious. Because civilization collapses way before the oil reserves are empty. Observe that John Peach is a MIT (Massachusetts Institute of Technology)-mathematician and physicist.

Very important update on the global fossil fuel reserves by John Peach

The next Peak Oil video chat led by Ukrainian-Canadian hippie Andrii Zvorygin was published yesterday. You can watch it here:

Nov Peak Oil Chat: John Peach, Jean Laherrère, Simon Michaux, assessment of fossil fuel reserves

In the introduction to the video, John Peach presents his research about the global fossil fuel reserves, both for oil, coal and natural gas.

He says that we have **22 years of oil left**, which takes us to 2047. This confirms the research presented in this blogpost of mine, and also my own date for the end of global oil reserves, which is 2048. This 2047 number is more radical than the 2037-2042 that was presented by Peach in this recent blogpost by him:

World Fossil Fuels Discoveries and Production. An analysis of current reserves. October 03, 2025, John Peach

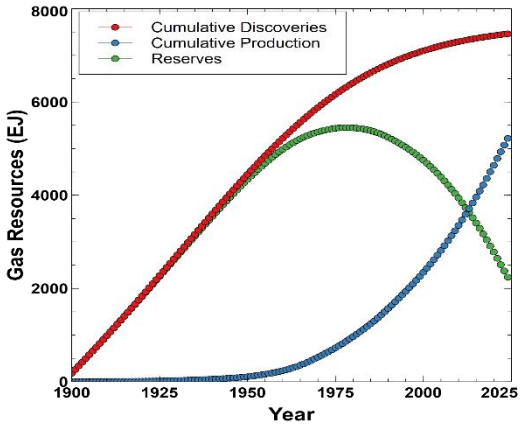
Peach says further that we have 20 years of natural gas left, which takes us to 2045 (1). This was new to me.

And what about coal? We have plenty of coal left, but not of so good quality, the quality is declining exponentially. But we have coal for 96 years (2), which takes us to the year 2119. Strange, but I had the impression from Art Berman that the situation for coal is even worse than it is for oil.

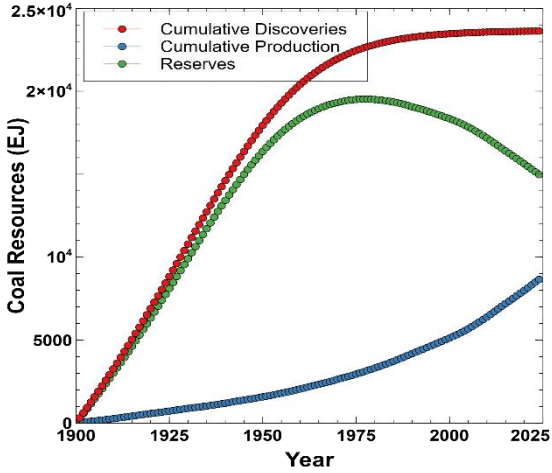
Is it possible to convert coal to oil, when we run out of oil, was a question in the panel. Yes, but it is not cost effective, was the answer, so it's not practically possible.

Peachs numbers for the end of the oil reserves was in this YouTube-presentation not so radical as in this recent blogpost by him, where the end of the oil reserves were put to the years 2037-2042.

(1) From this blogpost by Peach, this chart was also shown in the YouTube-video:



(2) From this blogpost by Peach, this chart was also shown in the YouTube-video:



The most radical estimates of how many years of oil is left

In this blogpost of mine from 17.6.2023 I presented the most radical estimates of how many years of oil we have left, that I could find on the internet. I landed then in 2032 as the earliest estimate I found, and that was only for the end of Saudi Arabia's oil reserves. For the whole world the most radical estimate was 2036, which was the late Colin J. Campbell's (1931–2022) estimate. This article from 2018 said that it could be even earlier, for the big oil companies, but it was a confusing article, I didn't really understand it, and it lacked needed references.

But I have forgotten (excuse me for this) a very important piece of information, and that is the extremely radical estimates of Ukrainian-Canadian hippie and peak oil expert Andrii Zvorygin and MIT-mathematician John Peach, presented in these two YouTube-videos:

Peak Oil Chat: Rystad, Shale, Kerogen, Climate, Forests, Reserves (see the graph "**Remaining World Oil**" 25.00 minutes into the video. There you see that the end of global oil reserves comes in 2029 at the earliest, for "**Proven Reserves**")

2024/01 Peak Oil Chat with Simon Michaux, Peak Oil, Hawaii, Inflation, Billionaire Bunkers, Weather (see the graph **"Recoverable oil by country and resource classification**" 0.43 minutes into the video)

In the last video above Andrii Zvorygin shows that we could have only 5-16 years of oil reserves left (counting 2PCS reserves, I don't really know what this 2PCS stands for, help me if you know), and this data builds upon Rystad Energy's data, which Andrii says is some of the best data we have. 5-16 years from 2024 is 2029-2040. It is in accordance with the graph in the first video above.

So I have an even more radical estimate than the 2032 for Saudi Arabia that I spoke about above. And that is **2029 for the whole world**. It feels way too radical, indeed. But it is useful and sobering to talk about it.

2029 harmonizes by the way with my calculations of the end of global oil exports. Some of the results of my calculations landed in 2025 as the end of global oil exports. So 2029 as the end of our oil reserves, plays in this strange division.

But soon 2025 is ended, so my prediction there failed miserably.

2040 as the end of global oil reserves harmonizes with Jeffrey Brown's 2032 date, my best-case scenario in my oil exports book. If the oil reserves are empty in 2040, **it is fully sensible to assume that the oil exports are empty in 2032**, and then we get too little oil exports, **way too little**, already in 2027-2028. And this is in fact Zvorygin's and Peach's **least radical estimate**. Peach knows very much about this. Zvorygin also seems very educated in the subject, and **smart**. He builds upon

Rystad data, i.e. upon the IEA of Norway. Notice that Zvorygin/Peach probably counted conventional oil (probably "crude+condensate"); conventional oil **minus condensate** should give even more radical numbers for the end of the oil reserves.